

The partially transparent electrical contact 3 consists, e.g., of the semiconductor indium-tin-oxide (ITO) or ZnO or of a combination of such layers, the back contact 4 may consist of a metal or a semiconductor or of both, as is known.

#### Patent claims

1. Method to produce a solar cell wherein on a substrate (7) a dissolvable intermediate layer (6) is deposited, on the intermediate layer (6) a layer structure (11) is deposited, the intermediate layer (6) is dissolved subsequently, which separates the layer structure (11) from the substrate (7), and thereby from the layer structure (11) a flexible solar cell is formed.
2. Method according to claim 1 wherein the layer structure (11) is formed by a supporting layer (5) and a layer stack (10).
3. Method according to claim 1 wherein the layer structure (11) is formed by a layer stack (10) and that after dissolution of the intermediate layer (6) the layer stack (10) is provided with a supporting layer (5).
4. Method according to one of claims 1 - 3 wherein after dissolution of the intermediate layer (6) the substrate (7) is reused.
5. Method according to one of claims 1- 4 wherein the intermediate layer (6) consists of a material of the group of the alkali-halogenides like NaCl, KCl, NaF or of the group of the IIa-fluorides like BaF<sub>2</sub>.
6. Method according to one of claims 1 - 5 wherein several combinations of layer stacks (10) with or without separating layers between the layer stacks are deposited one upon the other.
7. Application of the method according to one of claims 1 - 6 to produce energy on earth and in space and for consumer applications like pocket calculators and "smart cards".
8. Solar cell according to one of claims 1 - 7 consisting of at least one absorber layer (1) of a semiconductor, of at least one window layer (2) of a semiconductor to couple the light in, of at

least one at least partially transparent front contact (3) and at least one backcontact (4), wherein the solar cell contains at least one thin supporting layer (5) and that this supporting layer adjoins to the back contact (4) or is located on the front contact (3).

9. Solar cell according to claim 8 wherein the supporting layer (5) consists of a plastic, preferably a polyimide, or of a metal or ceramic, and that its thickness is 1 - 100  $\mu\text{m}$ , preferably 20  $\mu\text{m}$ .

10. Solar cell according to claim 8 or 9 wherein the absorber layer (1) consists of a material of the group of I-III-VI compounds of the periodic system, like  $\text{CuIn}_x\text{Se}_y$ ,  $\text{CuIn}_x\text{Ga}_y\text{Se}_z$ ,  $\text{CuIn}_x\text{Ga}_y\text{S}_z\text{Se}_u$  with  $x, y, z, u \geq 0$ , or of the II-VI compounds of the periodic system like  $\text{CdTe}$ , or III-V compounds of the periodic system like  $\text{Al}_{1-x-y}\text{Ga}_x\text{In}_y\text{As}_{1-u-w}\text{P}_u\text{N}_w$  with  $0 \leq x, y, u, w \leq 1$  or of group IV elements of the periodic system like  $\text{Si}$  or  $\text{Ge}$ .

11. Solar cell according to one of claims 8 - 10 wherein the window layer (2) consists of a semiconductor material with a band gap which is at least as large as that of the absorber layer (1), and where the structure of the layers is polycrystalline or amorphous.

12. Solar cell according to one of claims 8 - 11 wherein the absorber layer (1) consists of  $\text{CuIn}_x\text{Ga}_y\text{S}_z\text{Se}_u$  with  $x, y, z, u \geq 0$  and the window layer (2) contains at least one material of the group of doped or undoped  $\text{ZnO}$ ,  $\text{InSnO}$  (ITO),  $\text{CdS}$  and  $\text{ZnSe}$ .

13. Solar cell according to one of claims 8 - 12 wherein the flexible solar cell structure, depending on application, contains a rigid supporting material like glass, metal or ceramic.